[Total No. of Questions: 09]

Uni. Roll No. ....

[Total No. of Pages:2.]

Program: B.Tech. (Electrical)

Semester :3rd.

Name of Subject: Electrical Machines-1 (Transformers and DC Machines)

Subject Code: PCEE-103

Paper ID: 16066

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

1) Parts A and B are compulsory

2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice

3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

a) What is the effect of saturation in transformers?

b) Define armature reaction in DC machines.

c) What is inrush current phenomena in Transformers?

d) Which dc motor has high starting torque ? Give reason.

e) In a three phase transformer which type of connection is used to eliminate harmonics? Give reason.

f) Name the advantage of 4 point starter over 3 point starter in dc motors.

Part – B

[Marks: 04 each]

Q2. Explain the constructional features of DC Machine.

Q3. Draw and explain the equivalent circuit of a transformer.

Q4. Derive the Emf equation of Dc machine.

Q5. Elaborate the function of On load Tap changing (OLTC) in transformers.

Q6. A 450 V dc motor carries an armature current of 65 amperes and the speed of motor is 800 rpm. The armature resistance is 0.30 ohms. Determine the torque developed in Newton- meters.(N-m).

Q7. A 2200/250 V transformer takes 0.5 A at a p.f of 0.3 on open-circuit..Find the magnetising and active components of no- load primary current.

Page 1 of 2

Part – C   [Marks: 12 each]

Q8. Derive expression explaining the saving in copper in autotransformers as compared to conventional two winding Transformer. Also name the various advantages, disadvantages and uses of autotransformer.

OR

With the relevant circuit diagrams explain the various speed control and braking methods in dc motors.

Q9. In a 400 V, 50 HZ transformer, the total iron loss is 2500 watts. When the supply voltage and the frequency is reduced to 200 V and 25 Hz respectively the corresponding loss is 850 watts. Calculate the eddy current loss at normal voltage and frequency.

OR

A dc series motor has the following data:

(a) Rated supply voltage =220V

(b) Speed =480V

(c) Current taken=26A

(d) Resistance of the armature =0.6 Ohm

(e) Resistance of the field=0.4 Ohms

Determine the resistance needed to reduce the speed to 240 rpm when the current remains constant.

****